

FIRST RECORD OF THE GENUS *MYRMICA* (HYMENOPTERA: FORMICIDAE) FROM NORTHERN VIETNAM, WITH A DESCRIPTION OF TWO NEW SPECIES

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Abstract.— Two new *Myrmica* species (*M. titanica* and *M. yamane*) are described from the mountains of Northern Vietnam, and their taxonomic status is discussed. Also, the first report of *M. serica* from Vietnam and a new report of *M. rita* from Thailand are recorded.



Key words.— Ants, Formicidae, *Myrmica*, *M. titanica*, *M. yamane*, taxonomy, new species, Vietnam.

INTRODUCTION

Myrmica species mainly live in the Temperate Zone of the Holarctic Region but some are found on mountains in the northern parts of the Oriental Region. These include many species from the *rita* species-group of *Myrmica*, which is distributed from Taiwan to Himalayas, including southern China, northern Burma and Thailand (Radchenko and Elmes 1998, 1999; Elmes and Radchenko 1998). Workers and queens of the *rita*-group differ from other Palaearctic *Myrmica* by a variety of morphological features, particularly by very long propodeal spines, a long and low petiole, a fig-shaped postpetiole, and a long antennal scape (which is weakly curved at the base and usually longer than head).

Recently, Prof. Seiki Yamane sent us some *Myrmica* samples, collected in Northern Vietnam; these were the first records of genus *Myrmica* from Vietnam. The samples included three species, all of which belong to the *rita*-group. There were 2 workers of *Myrmica serica* Wheeler (Xeo Mi Ti, 1680 m., Sa Pa, Lao Cai, northern Vietnam, 29-30.vii.1998, leg. B. T. Viet). These specimens showed minor differences from typical *M. serica*, which were insufficient to warrant describing a new species; furthermore, *M. serica* appears to be relatively widespread in adjacent southern China (Radchenko and Elmes 1998). Three workers were sufficiently different from all other known species from the *rita*-group for them to be described as new for science (below). In addition, Prof. Yamane sent 6 workers of *Myrmica rita*

Emery (Northern Thailand, Doi Inanthon National Park, near Chaing Mai, 20.viii.1998, leg. S. Yamane, in rotten wood); this is only the third report of a species first collected in 1889 (see Radchenko and Elmes 1998, 1999).

METHODS

We took measurements of the three specimens (using a graticule accurate to 0.01mm) which can be compared with data for other species published by Radchenko and Elmes (1998). As in that paper, we use the following abbreviations for morphometrics and indices.

Morphometrics

- HL – length of head in dorsal view, measured in a straight line from the anterior point of median clypeal margin to mid-point of the occipital margin
- HW – maximum width of head in dorsal view behind the eyes
- FW – minimum width of frons between the frontal lobes
- FLW – maximum width between external borders of the frontal lobes
- SL – maximum straight-line length of antennal scape seen in profile
- AL – diagonal length of the alitrunk seen in profile, from the neck shield to the posterior margin of metapleural lobes (workers) and from the anterior-dorsal point of alitrunk to posterior margin of metapleural lobes (queens and males)
- HTL – length of tibia of hind leg

PNW – maximum width of pronotum from above in dorsal view (workers)

PL – maximum length of petiole from above

PPL – maximum length of postpetiole from above

PW – maximum width of petiole from above

PPW – maximum width of postpetiole from above

PH – maximum height of petiole in profile

PPH – maximum height of postpetiole in profile

ESL – maximum length of propodeal spine in profile

ESD – distance between tips of propodeal spine from above

SCW – maximum width of scutum from above (queens and males)

SCL – length of scutum+scutellum from above (queens and males)

AH – height of alitrunk, measured from upper level of mesonotum perpendicularly to the level of lower margin of mesopleurae (queens and males)

Indices

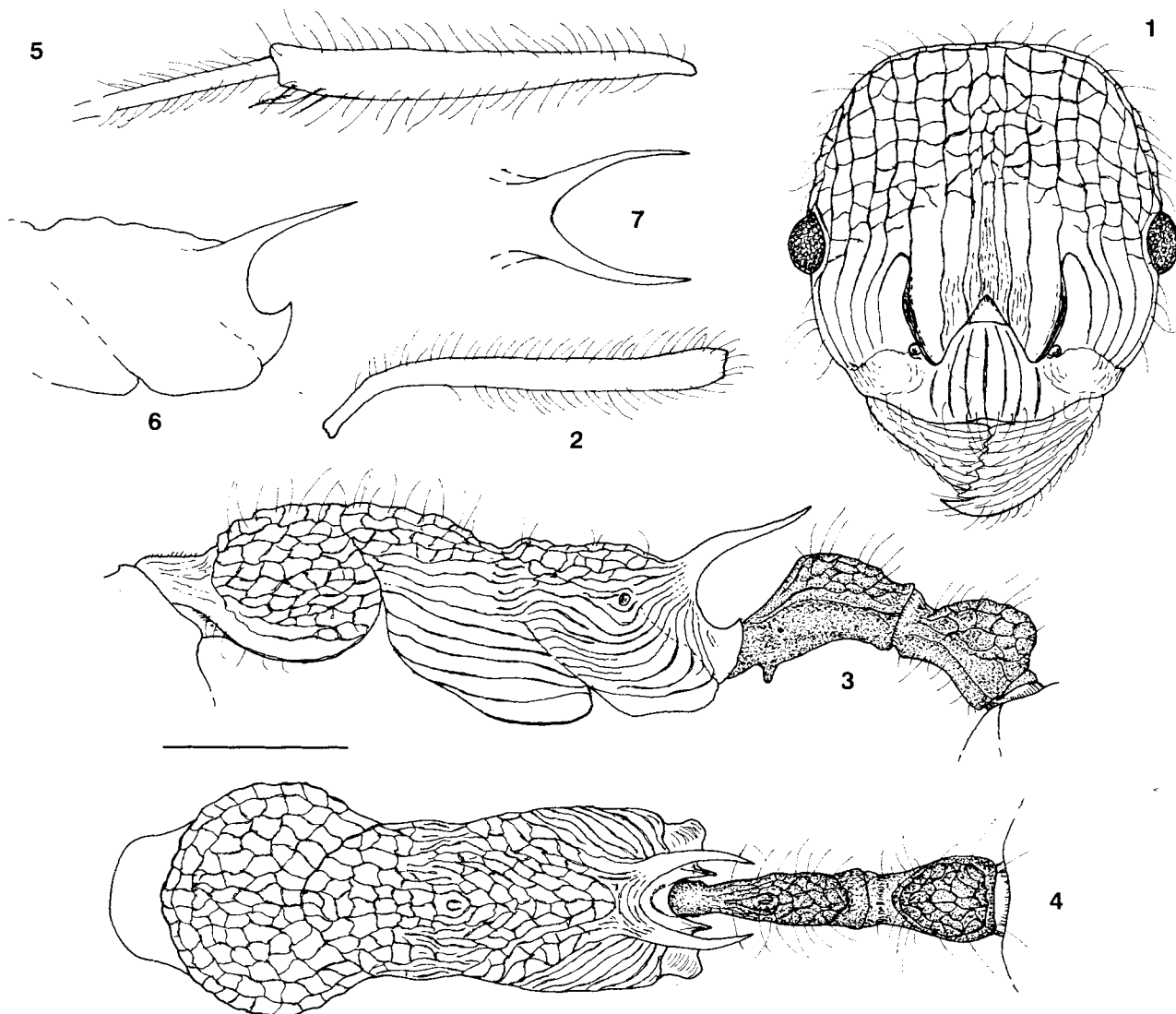
Cephalic	$CI = HL/HW$	Petiole (2)	$PI_2 = PL/HW$
Frontal	$FI = FW/HW$	Postpetiole (1)	$PP1 = PPL/PPH$
Frontal lobe	$FLI = FLW/FW$	Postpetiole (2)	$PP2 = PPH/PPW$
Scape (1)	$SI_1 = SL/HL$	Postpetiole (3)	$PP3 = PPW/PW$
Scape (2)	$SI_2 = SL/HW$	Spine-length	$ESL = ESL/HW$
Petiole (1)	$PI_1 = PL/PH$	Spine-width	$ESD = ESD/ESL$
Hind tibia length	$HTI = HTL/HW$		

DESCRIPTIONS

Myrmica titanica sp. nov.

(Figs 1–7).

Workers. Extremely large ants, currently the largest known *Myrmica* species (Table 1).



Figures 1–7. Details of structure of *Myrmica titanica* (1–5 – holotype, 6–7 – paratype, workers). (1) Head, dorsal view, (2) antennal scape in profile, (3) alitrunk and waist in profile, (4) same from above, (5) tibia of hind leg, (6) propodeum and propodeal spine in profile, (7) propodeal spines from above. Scale line for all figures equal to 1 mm.

	Species	<i>M. titanica</i>		<i>M. yamanei</i>
		Holotype	Paratype	Holotype
Morphometrics	HL	2.10	2.14	1.47
	HW	1.83	1.88	1.26
	SL	2.13	2.06	1.71
	FW	0.63	0.76	0.52
	FLW	0.74	0.88	0.57
	AL	3.30	3.35	2.33
	HTL	2.25	2.24	1.51
	PNW	1.32	1.33	0.92
	PL	1.02	1.04	0.80
	PH	0.53	0.55	0.39
	PW	0.38	0.39	0.29
	PPL	0.66	0.66	0.57
	PPH	0.56	0.59	0.56
	PPW	0.50	0.52	0.50
	ESL	0.90	0.83	0.83
Indices	ESD	0.48	0.62	0.62
	CI	1.15	1.14	1.17
	FI	0.34	0.40	0.41
	FLI	1.18	1.17	1.11
	SI ₁	1.01	0.96	1.16
	SI ₂	1.16	1.10	1.36
	PI ₁	1.92	1.90	2.04
	PI ₂	0.56	0.55	0.63
	PPI ₁	1.18	1.12	1.03
	PPI ₂	1.11	1.14	1.11
	PPI ₃	1.33	1.32	1.71
	ESLI	0.49	0.44	0.65
	ESDI	1.88	1.16	1.20
	HTI	1.23	1.19	1.20

Table 1. Measurements (mm) and indices for the holotype and paratype of *Myrmica titanica* sp. nov. and holotype of *Myrmica yamanei* sp. nov. See text for key to abbreviations.

Head longer than wide, with slightly convex sides and occipital margin, occipital corners broadly rounded and upper latero-ventral corners pointed; anterior clypeal margin shallowly but distinctly notched medially; mandibles with 7–8 teeth. Frontal carinae feebly curved, frons wide; antennal sockets surrounded by a single ruga. Antennal scape long (about the same length as head), gradually and weakly curved at the base.

Alitrunk long and low, with very weakly convex promesonotal dorsum, promesonotal suture visible from above, metanotal groove distinct and deep; metapleural lobes project apically to form sharp teeth. Propodeal spines very long, acute (in the holotype, they converge somewhat from their midlength but in the paratype specimen they are more or less straight, and slightly divergent, see Figs. 3, 4, 6, 7). Petiole long and narrow; its node slightly longer than peduncle, anterior surface very feebly concave and dorsal surface feebly convex, sloping

gradually downwards (seen in profile); postpetiole fig-shaped (from above), slightly longer than high, its anterior surface feebly convex with rounded node dorsum (in profile). Spurs on middle and hind tibiae well developed, distinctly pectinate.

Whole body with very coarse sculpture. Frons between frontal carinae levels with the eyes, with five to seven sinuous rugae. Only frons and genae with sinuous rugae, other part of head dorsum with coarse reticulation. Clypeus with coarse longitudinal rugae; mandibles coarsely striato-rugulose; frontal triangle smooth and shiny.

Alitrunk dorsum, petiole and postpetiole very coarsely reticulate; sides of pronotum with reticulation, mesopleurae and sides of propodeum with rugae. Surfaces between rugae of head and alitrunk not punctured, appearing smooth and shiny; petiole and postpetiole finely but distinctly punctured. Gaster smooth and shiny. Abundant long, outstanding hairs on head margins and alitrunk, extremely long hairs on promesonotal dorsum; very abundant, long erect hairs on antennal scapes and tibiae. Colour of alitrunk and head dark reddish-brown, gaster and appendages reddish-brown.

Queens, males and ecology are unknown.

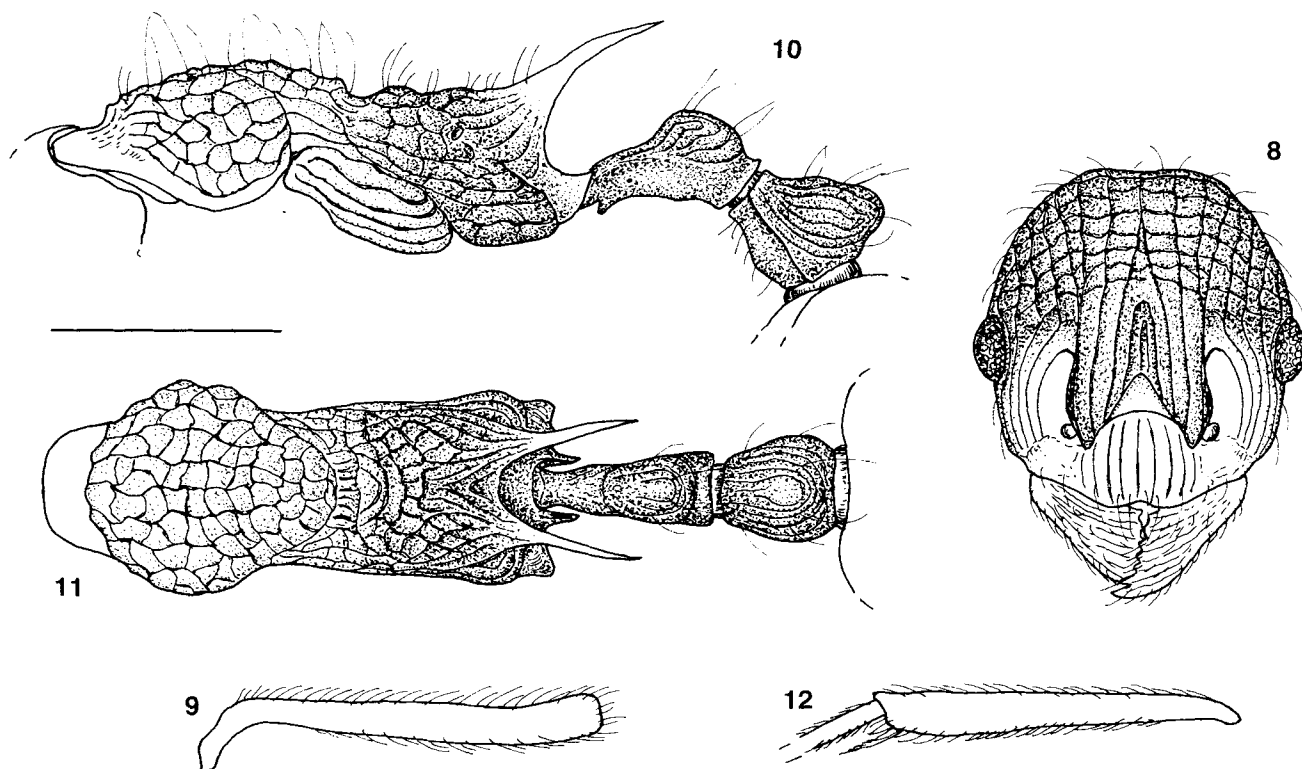
Types. Holotype worker, Northern Vietnam, Lao Cai, Sa Pa, Fan Sipan, alt. 2020 m, April 1998, leg. B. T. Viet; paratype worker with same label, probably from the same nest. Holotype in collection S. Yamane (Kagoshima University – see acknowledgement), paratype in G. W. Elmes collection.

Etymology. named after the mythological hero Titan, because it is the largest known *Myrmica* species in the World.

Myrmica yamanei sp. nov.
(Figs 8–12).

Worker. Head longer than broad (Table 1), with convex sides, more or less straight occipital margin and rounded occipital corners, and upper latero-ventral corners pointed; anterior clypeal margin shallowly but distinctly notched medially; mandibles with 7–8 teeth. Frontal carinae feebly curved, frons wide; antennal sockets surrounded by a single ruga. Antennal scape very long (longer than head), gradually and weakly curved at the base.

Alitrunk long and low, with convex promesonotal dorsum (in profile), promesonotal suture indistinct (from above); metanotal groove distinct and deep; metapleural lobes project apically to form sharp teeth. Propodeal spines very long, wide at the base, acute, more or less straight, projecting mainly upwards (in profile) and divergent (from above). Petiole long, low and narrow; seen in profile peduncle approximately same length as node, anterior surface strongly concave, node dorsum slightly convex; postpetiole fig-shape (from above), slightly longer than high, its anterior surface slightly convex and node dorsum narrowly rounded (in profile).



Figures 8–12. Details of structure of *Myrmica yamaneï* (holotype, worker). (8) Head, dorsal view, (9) antennal scape in profile, (10) alitrunk and waist in profile, (11) same from above, (12) tibia of hind leg. Scale line for all figures equal to 1 mm.

Spurs on middle and hind tibiae well developed and distinctly pectinate.

Whole body with very coarse sculpture. Frons between frontal carinae level with the eyes with six rugae. Only frons and genae with sinuous rugae, remainder of head dorsum with coarse reticulation; clypeus with coarse longitudinal rugae; mandibles striato-rugulose; frontal triangle smooth and shiny.

Alitrunk dorsum very coarsely reticulates, sides of pronotum with reticulation, mesopleurae and lower part of propodeal sides with rugae; petiole and postpetiole with coarse concentric rugae. Surfaces of head, alitrunk, petiole and postpetiole between rugae superficially but distinctly punctured, appearing dull (but punctures of pronotum somewhat reduced); gaster smooth and shiny. Numerous outstanding hairs present on head margins; hairs on alitrunk very long; hairs of antennal scapes and tibiae subdecumbent. Colour of alitrunk and head dark reddish-brown, gaster brownish-red, antennae and legs yellowish-red.

Queens, males and ecology are unknown.

Types. Holotype worker, Northern Vietnam, Lao Cai, Sa Pa, Xeo Mi Ti, alt. 1680 m, 29–30.vii.1998, leg. B. T. Viet. Holotype in collection of S. Yamane (Kagoshima University – see acknowledgement).

Etymology. This species is dedicated to the Japanese myrmecologist Prof. Seiki Yamane, who kindly sent us material for investigation.

DISCUSSION

Both new species clearly belong to the *ritae*-group. Despite its size, on all principle features *M. titanica* belongs in the *ritae*-complex (Radchenko and Elmes 1998), particularly by the coarse rugosity of the head and alitrunk, and the smooth surfaces between rugae on the head dorsum. Except for *Myrmica angulata* Radchenko *et al.* 2001, *M. titanica* differs from all other species of the *ritae*-complex by the punctures of the surfaces between rugae of the petiole and postpetiole. However, it clearly differs from *M. angulata* which has scapes that are sharply curved at their base, by its much larger size and gradually curved scapes (also compare measurements and indices with those in Radchenko *et al.* 2001). Superficially, it most resembles the previously largest known *Myrmica* species, *M. gigantea* (Collingwood), but is much larger than that species (HW > 1.80 mm *versus* < 1.65 mm; HL > 2.10 mm *v* < 1.90 mm; AL > 3.30 mm *v* < 2.60 mm). *M. titanica* also has much longer erect to suberect hairs on antennal scape and tibiae compared to *M. gigantea*. Furthermore, comparison of the various indices (Table 1) with those for *M. gigantea* holotype (Radchenko and Elmes 1998) and the second found worker (Radchenko and Elmes 1999), shows that *M. titanica* has relatively longer scapes (SI1 0.98 *v* 0.89), a relatively shorter petiole (PI1 1.13 *v* 1.55 and PI2 0.55 *v* 0.48), a relatively longer, higher but narrower postpetiole (PPI1 1.16

v 1.06; PPI3 1.33 v 1.43), relatively longer spines (ESLI 0.46 v 0.35) and legs (HTI 1.21 v 1.05).

The taxonomic position of the *M. yamane* is less clear. While it clearly belongs to the *ritae*-group, it shares features of both the *ritae*- and *boltoni*-complexes (Radchenko and Elmes 1998). The *boltoni*-complex differs from the *ritae*-complex by a much more finely rugose or even striated head and alitrunk, a punctured (not rugose) waist, and a head dorsum with distinctly punctured surfaces between the rugae. *M. yamane* has the coarse sculpture of the whole body which is typical of the *ritae*-complex (based on this feature we assign it to that complex), but the surfaces between rugae have the punctures that are typical in the *boltoni*-complex. This unusual combination of features well discriminates *M. yamane* from any known species from the *ritae*-group except for *M. draco* Radchenko et al. 2001. It differs from *M. draco* by its well-developed, coarse, reticulated sculpture of the head dorsum and by the punctures on surfaces between the rugae of the alitrunk (compare Figs. 8, 10, 11 with Figs. 11, 13, 14 in Radchenko et al. 2001).

The fact that a small number of samples from the mountains of northern Vietnam produced examples of three species from the *ritae*-group of *Myrmica* provides further confirmation of our opinion that there are proba-

bly many more *ritae*-group species endemic to particular mountain systems in northern Burma, Thailand, Laos and Vietnam, and of southern China, yet to be discovered (Radchenko and Elmes 1998).

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REFERENCES

- Elmes, G. W. and A. G. Radchenko. 1998. Ants of the genus *Myrmica* from Taiwan (Hymenoptera, Formicidae). *Chinese Journal of Entomology*, 18: 217–224.
- Radchenko, A. G. and G. W. Elmes. 1998. Taxonomic revision of the *ritae* species group of the genus *Myrmica* (Hymenoptera, Formicidae). *Vestnik Zoologii*, 32: 3–27.
- Radchenko, A. G. and G. W. Elmes. 1999. First description of the female of *Myrmica ritae* (Hymenoptera, Formicidae), with some notes on the *ritae*-group. *Vestnik Zoologii*, 33: 95–98.
- Radchenko, A. G., S. Zhou and G. W. Elmes. 2001. New and rare *Myrmica* species (Hymenoptera, Formicidae) from Southern China. *Annales Zoologici*, 51: 211–219.

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